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1442. From that period the Georgian race sank into an anarchy, only broken at the close of last century by the establishment of Russian domination.

[The following population-table of the Caucasus is taken from Russian sources :—

Tribe.	No. of Souls.
Abkhasians .. .. .	144,552
Svaneth .. .. .	1,639
Adigh .. .. .	290,549
Ubykh .. .. .	25,000
Turkish tribes .. .. .	44,989
Ossetes .. .. .	27,339
Tchetchians .. .. .	117,080
Tumenes .. .. .	4,719
Pshavs .. .. .	4,232
Khevsurs .. .. .	2,505
Lesghians and Daghestans .. .. .	397,761
	<hr/> 1,060,365

The languages of the Caucasus have been but little investigated ; but it has been ascertained that, with one exception, they belong to what is called the Turanian, *i. e.* neither to the Semitic nor to the Indo-Germanic family. The exception is the Ossete (Tren or Tronen), a distinctly Indo-Germanic language, a full grammar and vocabulary of which was published by Sjögren at St. Petersburg in 1844. An excellent sketch of a classification of the Caucasian languages is to be found in Prof. Max Müller's 'Languages of the Seat of War,' 1855.—W. SPOTTISWOODE.]

## 2. *Memorandum—Earthquake of Erzerum, June, 1859.* By ROBERT A. O. DALYELL, Esq., F.R.G.S., H.B.M. Consul at Erzerum.

THE first shock took place on the 1st June, about 8 A.M.: it was very sensibly felt, but did very little damage.\*

On the 2nd June, about 10·30 A.M., another shock occurred, lasting about 8 seconds; and was followed about 11·30 A.M. by another, but of shorter duration.

The vibrations were horizontal ; but, during the more violent shocks, a slight vertical motion is stated by some persons to have been perceptible. The direction of the shock appears to have been nearly from south-west to north-east.

On the 4th June a severe shock was felt at Tabreez, in Persia, which, however, did no damage to the town.

Schamaki, a town in the Caucasus, near the Caspian, has suffered very severely by a shock which occurred there within a day or two after the shock here ; but the Russian Consul informs me that his letters make no mention of the shock as having been felt in other parts of the Caucasus.

I have been unable to obtain accurate information as to how far the shock of the 2nd instant was felt at intermediate points towards the north and north-east, but it does not appear to have been felt at any great distance to the southward. The shocks of the 1st and 2nd were felt in various villages in the plain of Erzerum ; but, so far as I can ascertain, were not perceptible in the district of Tortoum. On the days of the shocks mentioned, the weather

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\* Erzerum is situated in latitude 39° 55' 20", and longitude 41° 18' 31". Height above the sea 6114 feet ; geological formations resembling those of the Caucasus ; mountains apparently metalliferous ; population about 35,000.

was sultry and lowering; but not, however, it is said, very much different from that usually prevailing at this season.

At a village, called Souk Tchermik,\* in the neighbourhood, a mineral spring, the water of which is usually of a blue colour, became darkened in colour, and retained such colour for two days.

The sense of disquietude mentioned by Humboldt, as affecting the lower animals during similar phenomenon, was very remarkable in the barking, on the occasion even of slight shocks, of the numerous dogs with which the town abounds.

For considerably more than a month, after the 2nd June, slight shocks continued to occur about once in the twenty-four hours: one or two were rather severe, but did not occasion any damage.

Slight shocks appear to be of frequent occurrence at Erzerum: they are not confined to a particular period of the year, but seem to be most frequent in spring.

The following is the official return of casualties furnished to the Pacha:—Killed, four hundred and sixty Mussulmans; eleven Gregorian Armenian Christians; one Catholic Armenian Christian; two Greek Christians.

The Turkish quarters of the town were those which suffered most severely. Four thousand five hundred houses were quite destroyed, or very seriously damaged; twelve mosques suffered more or less; nine minarets were quite destroyed; seven Turkish schools were completely destroyed; five baths, many of the fountains, and eight hundred and fifty shops were rendered useless. The khans, in which merchandize is deposited, being usually vaulted, have suffered very little.

The loss of life is probably not overstated: it would have been much greater had not the 2nd June been a great festival (the Ascension). Few, comparatively, of the population, either Mussulmans or Christians, were in the bazaars, and many of the latter were absent from their houses.

The very solidly built walls of the fortress, the palace of the Pacha, the Austrian, British, Persian, and Russian Consulates, all among the most solidly constructed buildings of the town, have sustained much damage.

The pyramidal top of the Lalé Pacha minaret was, by one shock, moved a considerable distance on the column, of which it forms the summit; and, by another shock, was brought back to its original position.

The Central Government has afforded some assistance to the poorer inhabitants in rebuilding, and a commissioner has arrived from Constantinople.

At about an hour's distance from Erzerum to the south, there is a point in the mountains surrounding the plain, which would appear to be the crater of an extinct volcano; † and a mountain of the range, forming the plain of Erzerum to the south, is easily recognizable by its form as an ancient crater. ‡

There are traditions in the country of a great earthquake which occurred about one hundred years ago, and by which, though the damage at Erzerum was not great, the villages in the plain of Passim, about twelve miles from Erzerum to the east, suffered severely.

It is said in the country that the lake of Tortoum § was, up to that date, much smaller than it is at present, and was then deepened by the falling of a mountain, which altered the course of the Tortoum Chai.

\* At many points in the plain of Erzerum there are hot mineral springs. Souk Tchermik is a cold spring, but its temperature is somewhat warmer in winter than in summer.

† See Hamilton's 'Researches in Asia Minor,' vol. 1, p. 178.

‡ It is described in Wagner's 'Reise nach Persien,' Leipzig, 1852, ch. vii.

§ For description of lake of Tortoum, see Kurzon's 'Armenia,' p. 155; and for description of remarkable geological formations, valley of Tortoum, see Hamilton's 'Researches in Asia Minor,' vol. 1, ch. xiii.

The appearance of the locality seems to me to confirm this tradition ; and, although my want of geological knowledge does not enable me to form any accurate opinion, I should consider that the whole country to the north-east of the lake of Tortoum bears evident traces of volcanic disturbances. The walls of two churches, the one at Ishkirt, the other at Vank (near the lake of Tortoum), are cracked in the manner I should be inclined to attribute to the action of an earthquake ; and I would mention a remarkable rift known in the country by the name of the *Dunya Buzurgu* (Greatness of the World) : this rift splits the mountain from top to bottom, and is about fifteen feet broad at the entrance. It took me from twenty minutes to half an hour to ride through it. The strata on the opposite sides correspond ; and, though a small stream flows through it, I should think, from its depth, the chasm can hardly have been formed by the action of water.

After careful inquiry on the spot I was unable to ascertain that shocks have, within memory, been felt in the valley of Tortoum, or on the districts to the north-east ; and I am inclined to believe that the slight shocks which I have above mentioned as a frequent occurrence are (except as they may form part of a wider system) confined to the town and plain of Erzerum ; and I am disposed to think are scarcely felt in that part of the plain which lies to the north of the branch of the Euphrates, which divides it into two portions.

I have, however, ascertained that within the last two years shocks, but apparently slighter in character than those experienced in this neighbourhood, have been felt at many points in the area, which would be bounded by lines drawn between Erzerum, Tiflis, Van, and Bayazid ; but I am unable to collect sufficient information to connect the dates or directions of such shocks with the dates or directions of those experienced here.

In conclusion, I may state that many buildings of solid construction have, for instance, at Van and its neighbourhood (about 200 years ago), at Bayazid, about sixty or seventy (?) years since, been destroyed, or have severely suffered by earthquakes ; although the shocks experienced of late appear, in this part of Turkey, to have been most severe in this immediate vicinity.\*

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### 3. *Letter from Capt. RICHARD BURTON, F.R.G.S., H.M. Consul to Fernando Po, to Dr. NORTON SHAW.*

ENCLOSED is a compass-sketch of the Ogun or Abeokuta river, which has not yet been regularly surveyed.

Captain Bedingfield, Dr. Eales of the *Prometheus*, and I left Lagos on the 29th October, in the first and second gigs, manned by Krumen.

Our line was across the large lagoon called in maps the Cradoo Waters : the word should be written Koradu, and the name is derived from a well-known market-town opposite Lagos. After two hours' rowing we entered the Agboi Creek, a short cut running nearly northwards. You will find it roughly laid down in Lieut. Glover's map, whereas the Ogun river sweeps round to the east.

On our return we came out by the mouth of the Ogun, which was nearly choked with grass. These rivers have no influents in their lower courses, and the soppy, muddy nature of their deltas, combined with want of waterfall, makes them shrink in volume as they near the sea.

After three hours' paddling up the fetid Agbai, and encountering a sharp tornado on the way, we entered the main river, a goodly stream, about 100

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\* Monsieur Abich, a distinguished Russian Seisologist, has published an account of the earthquake at Erzerum, of June 1859, and the earthquake at Schamake of the same period.